

Fig.1



Fig.2



9724 compact on-board starter for Titan ZG-62, Zenoah G-62.

9725 compact on-board starter for Titan ZG-45, Zenoah G-45.

9730 compact on-board starter for Titan ZG-80, Zenoah G-80.

Important safety note:

Please note that a combustion engine with built-in electronic on-board starter is not a toy. The combustion engine might start suddenly due to an unintentional activation. Please read the safety notes in the assembly instructions and in the appendix thoroughly.

You can mount the ZG-62/45 also in connection with the »Hydro-Mount-System Pitts« by Toni Clark. You can order the engine mount with all necessary fixing holes with stock number 9724-02 directly from us.

Assembly of the freewheeling gear (9524-04)

Figure 4 shows the assembly of the tappet 9524-06 and freewheeling gear. Properly tighten the nut 9524-03 with the thrust washer to fasten the tappet firmly on the engine shaft. The freewheel inside the gearwheel is pre-greased, so you only have to apply some bearing grease (included in the kit) on the free side. Make sure that no grease gets into the cone of the tappet. The tappet can easily be inserted into the

Assembly of the engine mounting plate (9724-01)

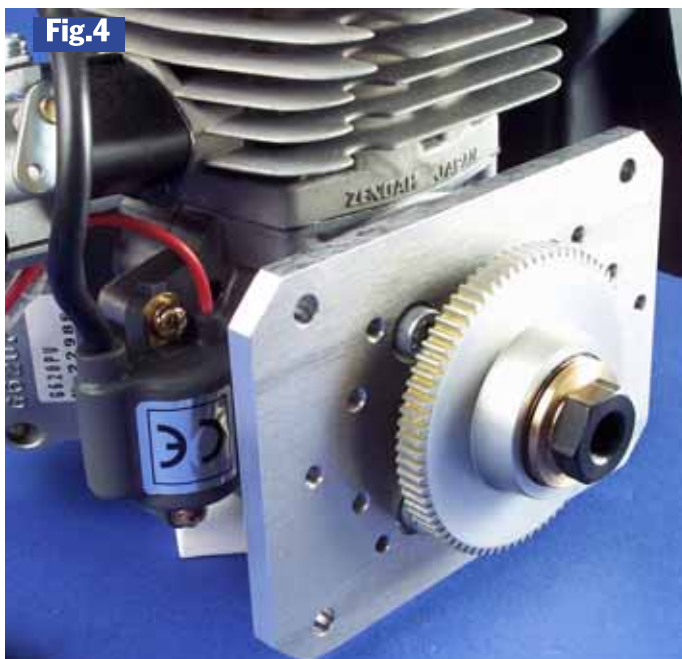
If an engine mount is attached to the combustion engine disassemble the engine mount prior to the assembly of the electronic on-board starter. Then mount the engine mounting plate that is included in the kit (fig. 3). Use the screws M6x16 with the retaining ring to attach the support plate.

Fig.3



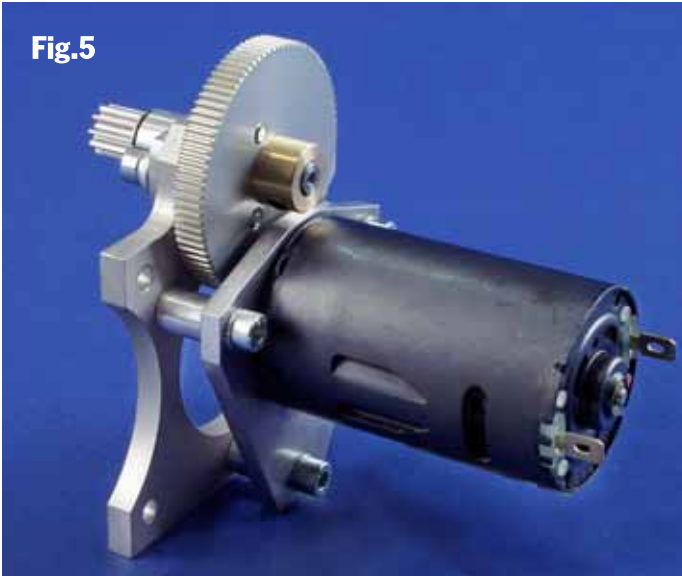
In connection with the engine mounting plate for »Hydro-Mount-System Pitts« attach the distance bolts with a length of 10mm between combustion engine and engine mounting plate. Use the screws M6x25 for fastening.

Fig.4



freewheel by turning it clockwise. The mounted freewheeling gear has to have a slight axial clearance. It can easily be turned against rotating direction but immediately engages when turned into rotating direction.

Fig.5



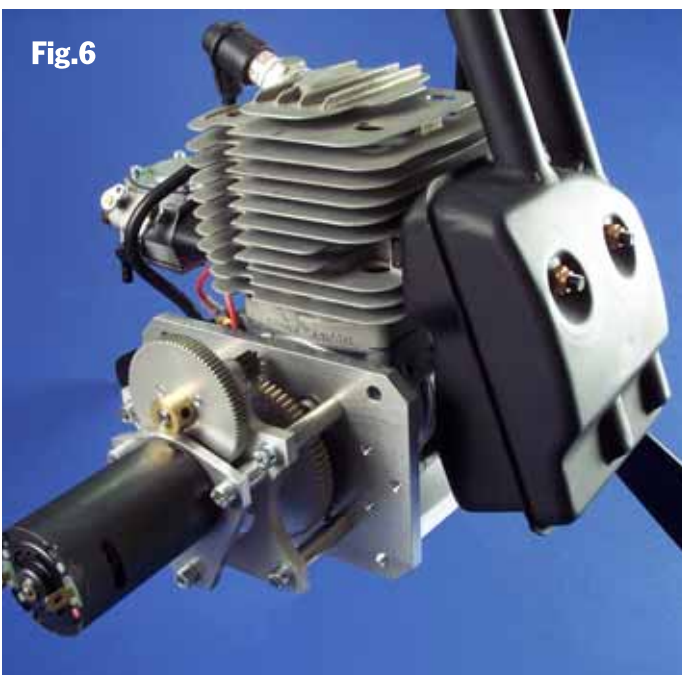
Assembly of the gear unit with starter engine

The bevel mounting plate 9724-04 with bevel 9500-06 and the aluminium gearwheel 9724-09 are pre-assembled and included in the kit. You only have to screw together the starter engine 9575-03 and the support plate of the electric motor 9724-07. Do this using the screws M3x10 with the retaining ring. Then screw together the pre-assembled unit with the bevel mounting plate by using the screws M4x20 with the retaining ring and the distance bolts with a length of 10mm. Make sure to provide a slight tooth clearance. (Fig. 5)

Assembly of the complete gear unit on the engine mounting plate

Figure 6 shows the assembly of the gear unit. Use 4 distance bolts with a length of 28mm as spacers. Tighten the unit with the screws M4x40 with retaining ring. Make sure to provide a slight tooth clearance.

Fig.6



By manually turning the aluminium gearwheel 9724-09 against starting direction you can check if the complete starting unit can be turned smoothly.

The mechanical assembly of the on-board starter is now completed.

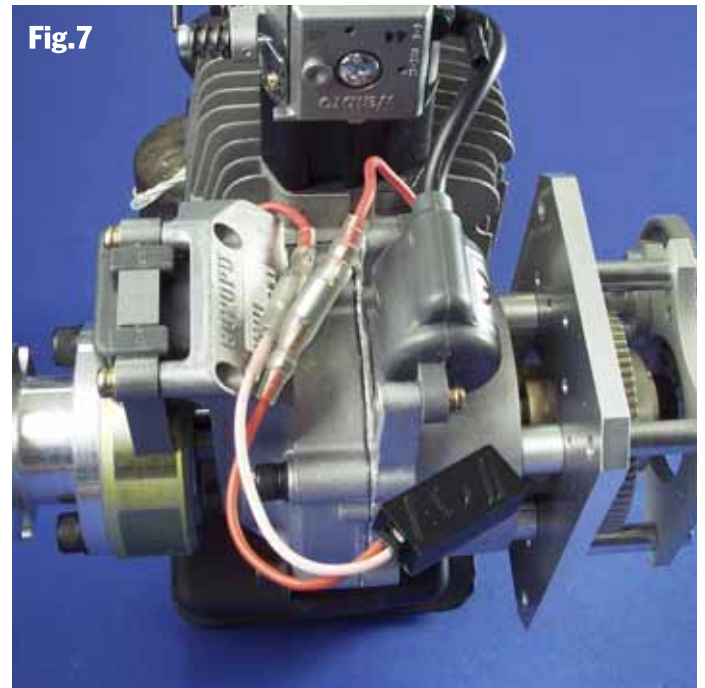
Note:

The bevel 9500-06 must not exert edgewise pressure on the freewheeling gear 9524-04 as this would destroy the freewheeling.

Assembly of the electronic unit

To reduce the danger of a kick-back at turning the combustion engine on and off you have to mount the enclosed electronic unit. Therefore separate the connection between field coil and ignition coil and grind in the electronic unit 9724-10. (Fig. 7)

Fig.7



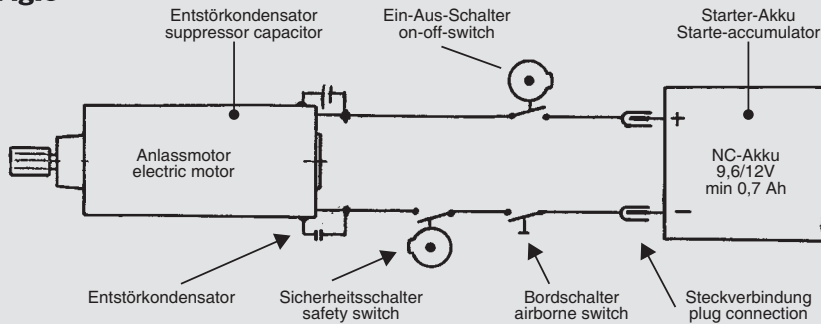
1.Control of on-board starter via the radio control (fig. 8).

We recommend the following function sequence:

As shown in the circuit diagram of fig. 8 three switches are required for the controlling of the on-board starter which are connected in series. We recommend to mount the airborne switch in the model countersunk to avoid an unintentional operation. The »on-off« position of the switch has to be marked distinctly. (Fig. I)

The safety switch is provided for your safety. It prevents starting of the combustion engine while the throttle lever of the radio control is not in a position between idle speed and increased idle speed. The safety switch is operated by the gas servo and is only closed in a position between idle speed and increased idle speed. (Fig. II)

Fig.8



Additional interference suppression of the starter engine

To avoid interferences on the receiver side the starter engine has to be suppressed. The starter engine is already pre-suppressed with two condensers that are attached to the engine. You only have to solder in the enclosed condsenser between the positive and negative pole.

2. Start of the combustion engine only on ground (fig. 9).

For this operation the starter battery is connected from the outside via a airborne starter. The micro switch for starting and stopping the starter engine can be attached to the airborne starter and is operated manually. The connecting line between starter battery and model should not exceed a length of 100cm to avoid power loss. For this mode we recommend 12-Volt car batteries. This mode is very safe regarding accidents, and you don't need help for the start of the combustion engine.

Fig. I Bordschalter
airborne switch

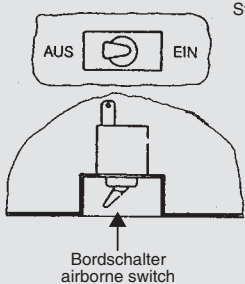


Fig. II Sicherheitsschalter
safety switch

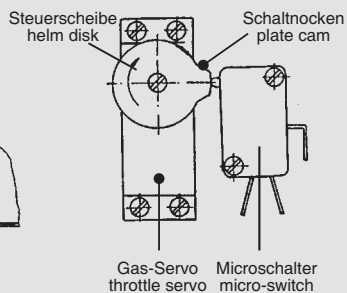
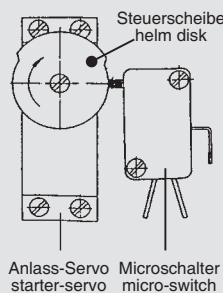


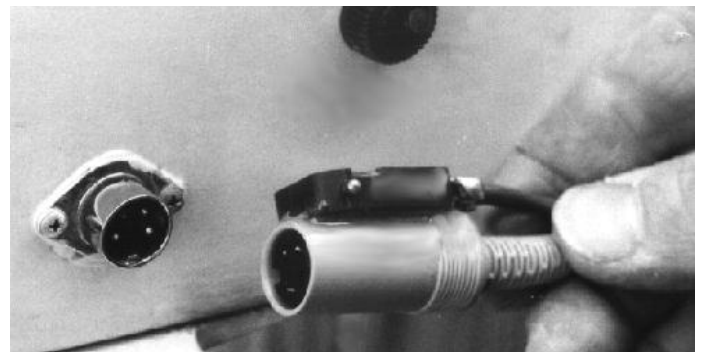
Fig. III Ein-Aus-Schalter
on-off-switch



The micro switch for turning the starter engine on and off is operated via the starter servo. (Fig. III)

You can also use IC servos with put-on polarity-reversal switch (16A), f. ex. Graupner C508 with polarity-reversal switch (stock number 3945).

Attach the starter battery and the switches as near as possible on the combustion engine. Make sure that the cables between the starter battery, safety switch, on-off switch and starter engine are as short as possible. They should have a minimal distance of 100mm to receiver and antenna to avoid radio interferences. We recommend soldered junctions for wiring (plug connections cause unnecessary transfer resistance). Tin-plate the flexible wires prior to soldering them! After cooling check each soldering by shaking it. The starter battery is connected via high-quality plugs.

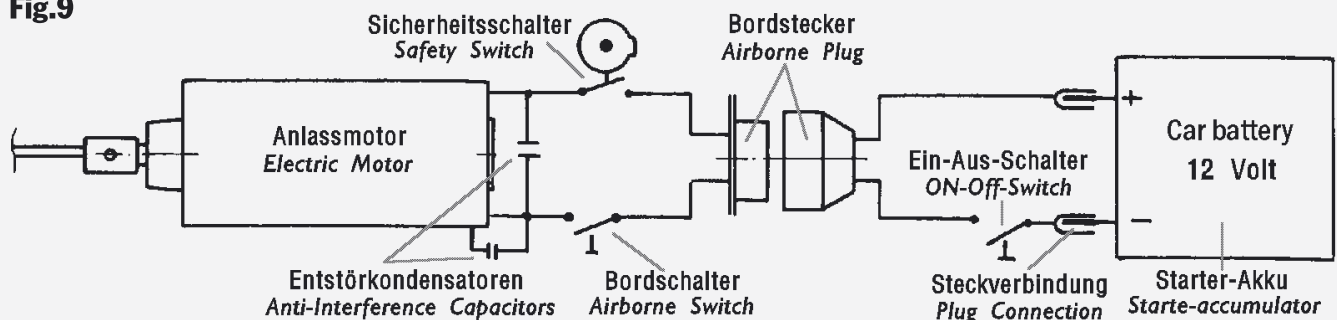


Recommended starter battery:

1 starter battery 10.8-12Volt, min. 1Ah for Zenoah/ Titan ZG-45/62.

Only high-amperage (16A) NC, NiMh and LiPo batteries (as used for electronic flying models) are suitable as starter batteries.

Fig.9



9730 compact on-board starter for Titan ZG-80, Zenoah G-80.



Assembly of the engine mounting plate 9730-01.

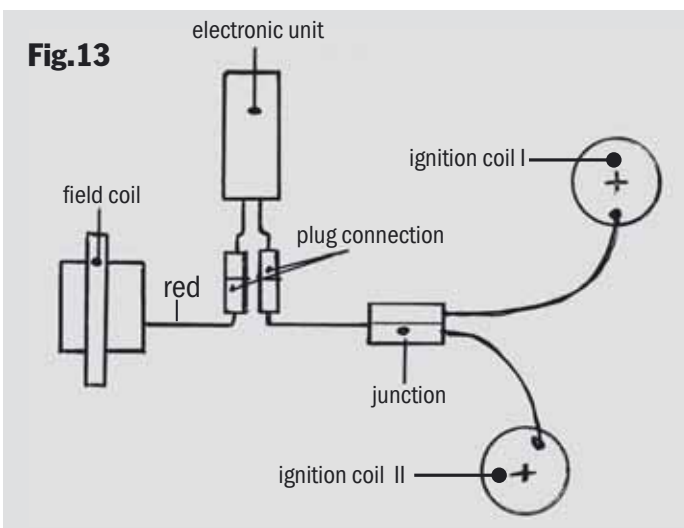
If there is a combustion engine attached to the engine mounting plate it has to be disassembled prior to the assembly of the electronic on-board starter. Then assemble the engine mount included in the kit (fig. 11). Disassemble the carburettor on the combustion engine before the assembly to obtain an easy access to the mounting bolts. Use the screws M6x16 with retaining ring for fastening.



Note:
The assembly of the gear unit with starter engine as well as the assembly of the complete gear unit on the engine mounts is identical to the assembly instructions of 9724/9725 as well as figures 5/6 and 10.

Assembly of the electronic unit.

To reduce the danger of a kick-back at the turning on and off you also have to mount the enclosed electronic unit for the Zenoah G-80 and Titan ZG -80. Therefore separate the plug connection between the field and ignition coils and grind in the electronic unit (see fig. 13).



Assembly of the freewheeling gear 9724-04.

See fig. 12 for the assembly of the tappet 9730-06 and the assembly of the freewheeling gear. Fully tighten the screw 9730-03 to securely attach the tappet on the engine shaft. The collar of the thrust washer 9730-34 points to the hexagon of the screw 9730-03. (For more information see assembly instructions 9724/9725)

Note: For ZG-80 with Easy-Starter-System you have to start with the disassembly of the sensor at the field coil and the socket.

Note: The control and the start of the on-board starter is identical with the assembly instruction 9724/9725.

Recommended starter battery

1 starter battery 12-15Volt, min. 1Ah for Zenoah/Titan ZG-80. Only high-amperage (16A) NC, NiMh and LiPo batteries (as used for electronic flying models) are suitable as starter batteries.

Starting: Zenoah/Titan ZG-45, 62, 80.

Before the first operation you have to grease the gearwheels with a high-quality gear grease. The freewheeling is already greased and you only need to drip a few drops of sewing-machine oil onto the upper front side prior to every take-off. After fully tightening and securing all screw connections you can now try the first take-off. If the starter engine has the wrong direction, then the electrical connections of the engine have to be swapped.

Prior to the first start please measure the voltage on the electric motor under load. The voltage must not fall under 10 V. Stop the ignition while measuring (remove plug). Check the starter battery if the voltage falls below this value.

Important notes:

To avoid the kick-back of the Titan/Zenoah engines you have to regard the following:

Two servos are required for the safe starting and stopping of the combustion engine. The circuit diagram of figure 8 shows that the electric motor of the on-board starter is switched on and off by the starter servo.

The second servo operates the choke and the contact breaker (see fig. 14). Thus the starter engine of the on-board starter can be switched on and off independently from the choke operation and contact breaker.

The Zenoah/ZG engines are shipped with a black cable on the field coil that is used to interrupt the ignition. (If the cable of your engine was cut you have to mount a new field coil.) To interrupt the ignition you have to ground the black cable via the micro switch IV that is included in the kit (fig. 15). A fastening screw of the ignition coil is used as mass point. Keep the cable as short as possible to avoid radio interferences. The control disk for the interruption of the ignition must be implemented in such a way that an activation or deactivation can be performed with the half open choke.

Figure 14 shows one example for the combination of choke operation and ignition interruption. While there are other possible technical realisations you have to stick exactly to the functional sequence.

Starting of the combustion engine

Do not start the starter engine until the choke is completely closed over a servo. When the combustion engine has taken in sufficient fuel the choke is slowly opened while the starter engine is running. At the start the throttle lever is in the position of slightly increased idle running. With this method the combustion engine is activated safely without the danger of a kick-back.

Stopping of the combustion engine

The combustion engine is always stopped by closing the choke. Do not stop the combustion engine via the idle trim at the throttle lever. The stopping via the idle trim causes a leaning of the Titan/Zenoah and might cause a kick-back, even with assembled electronic unit.

Hand launching

Do not hand launch the Titan/Zenoah with assembled on-board starter. Hand launching might cause an intermittent kickback.

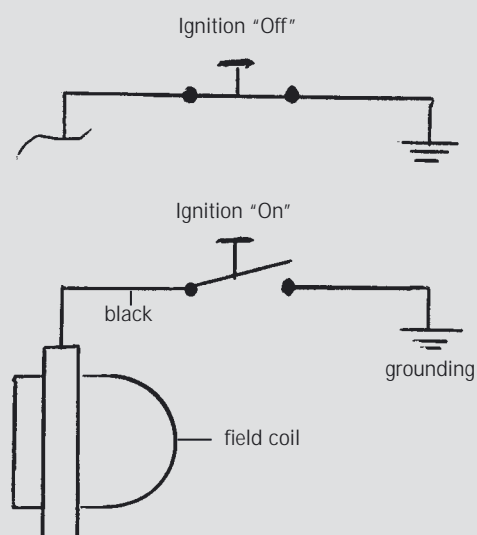
Notes:

If the freewheeling does not couple after a longer operational stop then typically the grease has hardened. Clean it with petrol or spirit and lubricate it with bearing grease. Make sure that the rollers do not drop out of the free-wheel during cleaning. Dropped rollers can be re-inserted easily.



Fig.14

Fig.15



Spare parts



Description	9724	9725	9730
engine mounting plate/mount	9724/01	9724/01	9730/01
engine mount »Hydro-Mount-System Pitts«	9724-02	9724-01	-
tappet	9724/06	9724/06	9730/06
freewheeling gear	9524/04	9524/04	9524/04
thrust washer	9530-34	9530-34	9530-34
nut M10x1 / M8x1	9724/03	9725/03	9730/03
bevel mounting plate	9724/04	9724/04	9730/04
bevel bearing	9724/05	9724/05	9724/05
bevel 10 teeth	9500/06	9500/06	9500/06
al-gearwheel 90 teeth	9724/09	9724/09	9724/09
support plate of electric motor	9724/07	9724/07	-
starter engine Speed 600, with bevel 12 teeth	9575/03	9575/03	9575/03
micro switch 16 A	9560/04	9560/04	9560/04
airborne switch 16 A	9560/07	9560/07	9560/07
cable set without switch	9560/06	9560/06	9560/06
electronic unit	9724/10	9724/10	9724/10

Warranty

Our electric on-board starters are shipped as kits. The professional assembly and normal operation is beyond our influence. Therefore the warranty is limited to components included in the kit as well as their functioning. We assume no liability for damages resulting from improper assembly or operation.

We wish you many successful starts – and as many happy landings.